

**Remarks**

Support for the above-requested amendments to claim 16 is found at least on page 4, lines 24-26. Support for the amendments to claim 38 is found at least at page 3, lines 25-29. Claims 19, 21, and 22 have been amended to correct antecedent basis. Claim 39 has been canceled without prejudice. Claims 1-15, 17, and 23-30 were canceled without prejudice in a previous Amendment.

Claims 16, 18-22, 31-38, and 40-44 are before the Examiner for consideration.

**Rejection Under 35 U.S.C. §103(a)**

Claims 38, 43, and 44 have been rejected under 35 U.S.C. §103(a) as being obvious over German Patent No. 119852159 to Formann, *et al.* (“DE ‘159 in view the internet publication dated July 30, 2001, from the website <http://www.twintex.com/fabrication-processes/tw-process.html> (“Saint Gobain”). The Examiner asserts that DE ‘159 teaches feeding a hybrid yarn (*e.g.*, 50% propylene and 50% natural fiber) into an extrusion device where it is subjected to heat within an extrusion nozzle. It is asserted that the extrusion device supplies molten plastic to the commingled filaments. Additionally, the Examiner asserts that after being provided with the thermoplastic material, the commingled and heated filaments are subjected to a winding operation wherein the formed band is wound upon a mandrel. The Examiner admits that DE ‘159 fails to teach that a glass fiber is employed as the reinforcing yarn or preheating the material separate of the extrusion nozzle prior to introduction of the matrix material.

In this regard, the Examiner asserts that one of skill in the art would have known to incorporate a hybrid blend of glass and propylene fiber material and to preheat the hybrid commingled material prior to entrance into the die as is assertedly taught by Saint Gobain. In particular, the Examiner asserts that Saint Gobain teaches that a commingled material was heated with IR heating prior to being received by a co-extrusion device.

Additionally, the Examiner admits that DE ‘159 does not teach filament winding the product. However, it is asserted that DE ‘159 suggests filament winding subsequent to the extrusion operation. The Examiner concludes that it would have been obvious to one of skill in the art to utilize the techniques of Saint Gobain in the process of DE ‘159 to filament wind with a glass reinforcing fiber and a polypropylene blend.

### **Applicants' Response**

In response to this rejection, Applicants respectfully direct the Examiner's attention to independent claim 38 and submit that claim 38 defines a method for manufacturing a body of revolution that is not taught within DE '159 and Saint Gobain. In addition, Applicants submit that DE '159 and Saint Gobain fail to teach the combination of features recited in claim 38.

Applicants respectfully submit that DE '159 and Saint Gobain do not teach or suggest a method for manufacturing a body of revolution that includes a step of heating at least one first composite strip containing a first amount of reinforcing material where the first composite strip is formed of intimately mingled continuous strands formed of glass filaments and organic thermoplastic filaments. DE '159 teaches a method that includes drawing reinforcement fibers or semi-finished thread products that can be processed in a winding method, impregnating them in a sheathing nozzle with a thermoplastic melt supplied by a melt extruder, and laying them on a turning mold core. (*See, e.g.*, page 2, lines 22-28 of the English translation of DE '159). DE '159 specifically teaches that the semi-finished thread product may be a roving, yarn, filament, sliver, fabric or hybrid fiber yarn *in roving form*. (*See, e.g.*, page 2, lines 18-21 and page 3, lines 17-18 of the English translation of DE '159). There is simply no teaching or suggestion of a composite strip, and particularly no teaching or suggestion of a composite strip that is formed of intimately mingled continuous strands formed of glass filaments and organic filaments as required by claim 38.

With respect to the teachings of Saint Gobain, Applicants respectfully submit that although Saint Gobain suggests a method for processing commingled *rovings*, there is absolutely no teaching or suggestion within Saint Gobain of a "strip" or a "composite strip". Applicants further submit that a strip cannot be inferred from the two-dimensional cross-sectional view in Saint Gobain or a teaching of drawing the rovings over a series of heated impregnation bars. (*See, e.g.*, Pulextrusion process on page 3 of Saint Gobain). It is respectfully submitted that neither DE '159 nor Saint Gobain teaches or even suggests a composite strip. Accordingly, Applicants respectfully submit that the combination of DE '159 and Saint Gobain would not result in the method of claim 38. Thus, it is respectfully submitted that claim 38 is non-obvious and patentable for at least this reason.

Additionally, Applicants respectfully submit that DE '159 and Saint Gobain do not teach or suggest passing a heated composite strip through a pivotable laying device to position a lay angle of the composite strip as claimed in claim 38. DE '159 teaches a method

that impregnates a semi-finished thread product with a thermoplastic matrix and laying the impregnated thread product on a rotating mold core. (*See, e.g.*, page 3, lines 1-3 of the English translation of DE '159). DE '159 also teaches producing winding bodies with a predefined pattern by adjusting the fiber winding and support speed. (*See, e.g.*, page 4, lines 11-16 of the English translation of DE '150). DE '159 does not, however, teach or suggest a pivotable laying device to position a lay angle of a composite strip. DE '159 merely teaches laying the impregnated semi-finished product onto the winding core. (*See, e.g.*, page 2, lines 18-21; page 3, lines 1-3; and page 4, lines 11-13). Indeed, DE '159 is silent with respect to any teaching or suggestion of passing a heated composite strip through a pivotable laying device to position a lay angle of the composite strip as required by claim 38. Saint Gobain does not teach or suggest any kind of winding, and is therefore silent with respect to any kind of pivotable laying device. Accordingly, Applicants submit that claim 38 is non-obvious and patentable for this additional reason.

Further, Applicants submit that there is no motivation for one of skill in the art to arrive at a method for manufacturing a body of revolution as claimed in claim 38 based on the disclosures of DE '159 and Saint Gobain. In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. (*See, e.g., Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August 2008, §2143 citing *KSR International Co. v. Teleflex Inc.*, 550 U.S.398, 82 USPQ2d 1385 (2007)).

Applicants respectfully submit that one of ordinary skill in the art would simply not be motivated to arrive at the method of claim 38 based on the teachings of DE '159 and Saint Gobain because neither DE '159 nor Saint Gobain teaches or even suggests (1) a composite strip that is formed of intimately mingled continuous strands formed of glass filaments and organic thermoplastic filaments or (2) passing a heated composite strip through a pivotable laying device to position a lay angle of the composite strip as is required in independent claim 38. Indeed, DE '159 and Saint Gobain are silent with respect to any teaching or suggestion of a composite strip or a pivotable laying device. Without some teaching or suggestion, there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness.

In addition, it is respectfully submitted that because DE '159 and Saint Gobain do not teach or suggest a composite strip that is formed of intimately mingled continuous strands formed of glass filaments and organic thermoplastic filaments or passing a heated composite strip through a pivotable laying device to position a lay angle of the composite strip, DE '159 and Saint Gobain, alone or in combination, fail to teach all of the claim limitations set forth in claim 38. Therefore, it is submitted that a *prima facie* case of obviousness has not been established for this additional reason.

In view of the above, it is respectfully submitted that independent claim 38 is not taught or suggested by DE '159 and Saint Gobain, and that claim 38 is therefore non-obvious and patentable. With respect to dependent claims 43 and 44, Applicants submit that because independent claim 38 is not taught or suggested by DE '159 and Saint Gobain and because claims 43 and 44 are dependent upon claim 38 and contain the same elements as claim 38, dependent claims 43 and 44 are also not taught or suggested by DE '159 and Saint Gobain.

In light of the above, Applicants submit that claims 38, 43, and 44 are not obvious over DE '159 in view of Saint Gobain and respectfully request that the Examiner reconsider and withdraw this rejection.

**Rejection under 35 U.S.C. §103(a)**

Claims 16, 18-22, 31, 32 and 40-42 have been rejected under 35 U.S.C. §103(a) as being obvious over German Patent No. 119852159 to Formann, *et al.* ("DE '159) in view the internet publication dated July 30, 2001, from the website <http://www.twintex.com/fabrication-processes/tw-process.html> ("Saint Gobain") and U.S. Patent No. 3,529,050 to Smith ("Smith"). In particular, the Examiner asserts that DE '159 and Saint Gobain suggest that the thermoplastic would have been introduced into the extrusion die to provide a matrix for the reinforcement. The Examiner admits that there is no teaching in DE '159 that one of skill in the art would have introduced the material in an off-center manner. In this regard, the Examiner asserts that Smith teaches the introduction of resin to a die where the resin was introduced under pressure such that there was a layer of resin matrix (*i.e.*, resin rich) region in the finished assembly. The Examiner asserts that Smith teaches that it was known to introduce the resin such that a resin rich surface was formed on the surface and to introduce the matrix material off-center in order to provide a superior surface finish. The Examiner concludes that it would have been obvious to one of skill in the art to provide the resin in the die where the reinforcement was positioned off-center as is assertedly taught by Smith in the

process of making a composite strip and then winding the strip as taught by DE '159 to provide a desired surface finish to the material.

### **Applicants' Response**

In response to this rejection, Applicants respectfully direct the Examiner's attention to independent claims 16 and 38 and submit that claims 16 and 38 define methods for manufacturing a body of revolution that is not taught or suggested within DE '159, Saint Gobain, and Smith. In addition, Applicants submit that DE '159, Saint Gobain, and Smith fail to teach the combination of features recited in claims 16 and 38.

With respect to claim 16, Applicants respectfully submit that DE '159, Saint Gobain, and Smith do not teach or suggest a method for manufacturing a body of revolution that includes a step of introducing at least one first heated composite strip formed of intimately mingled continuous strands formed of glass filaments and filaments of organic thermoplastic into at least one die where the first composite strip has a width from about 1 to about 10 cm. Smith teaches feeding a plurality of fiber reinforcing strips (*e.g.*, glass fiber mats) into a resin pan containing a liquid thermosetting resin. (*See, e.g.*, column 2, lines 7-12). As the strips advance through the resin, they pass through an inlet opening and enter a tapered configuration of the entrance portion that gradually compresses the strips laterally until they enter the forming passage where they are then compressed vertically. (*See, e.g.*, column 2, lines 29-34). Heat is applied to the resin impregnated strips at the tapered opening to accelerate the curing of the resin and solidify the article while the resin impregnated filaments are under pressure. (*See, e.g.*, column 2, lines 38-43). Smith also teaches that a surface of the compacted reinforcements is coated with a layer of the high viscosity resin. (*See, e.g.*, column 3, lines 6-14).

Applicants submit that Smith teaches the application of a resin to a surface of fiber reinforcing strips (*e.g.*, compacted glass fiber mats). Applicants respectfully submit that there is no teaching or suggestion within Smith of winding or a winding process, particularly winding a composite strip formed of a second material reinforced with a first composite strip having a width of 1 to 10 cm as claimed in claim 16. Applicants respectfully submit that the composite strip of Smith is used to form a shaped and solidified article of manufacture. (*See, e.g.*, column 1, lines 53-61 and column 3, lines 52-57). Additionally, it is respectfully submitted that the composite strips of Smith used to form the cured articles are much greater in size than the claimed width of the first composite strip of 1 to 10 cm. Indeed, Smith clearly teaches that the strip may be glass fiber mats. (*See, e.g.*, column 2, lines 7-8).

Applicants respectfully submit that one of skill in the art would appreciate that a glass fiber mat is much greater in width than 10 cm.

Also, Applicants submit that the cured composite strip formed by Smith is not intended to be wound on a rotating support. Indeed, Smith teaches the formation of a shaped and solidified article and is silent regarding a winding process. It is respectfully submitted that one of skill in the art would not have any motivation to wind the composite strip of Smith (or the cured, elongated article made therefrom) around a rotating support. Furthermore, it is respectfully submitted that such a strip as taught by Smith would simply not work in a winding process.

In addition, Applicants submit that, as discussed in detail above, neither DE '159 nor Saint Gobain teaches or suggests a first composite strip that is formed of intimately mingled continuous strands formed of glass filaments and organic thermoplastic filaments. As such, it is respectfully submitted that the combination of the teachings of DE '159, Saint Gobain, and Smith would not result in the presently claimed method. Accordingly, it is respectfully submitted that claim 16 is non-obvious and patentable.

Also, Applicants respectfully submit that there is no motivation for one of skill in the art to arrive at a method for manufacturing a body of revolution as claimed in claim 16 based on the disclosures of DE '159, Saint Gobain, and Smith. In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. (*See, e.g., Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August 2008, §2143 citing *KSR International Co. v. Teleflex Inc.*, 550 U.S.398, 82 USPQ2d 1385 (2007)).

Applicants respectfully submit that one of ordinary skill in the art would not be motivated to arrive at the method of claim 16 based on the teachings of DE '159, Saint Gobain, and Smith at least because the solidified composite strip formed by Smith is not intended to be wound (and cannot be wound) on a rotating support. Indeed, it is respectfully submitted that Smith teaches a composite strip that is much larger in width than the claimed composite strip that has a width of about 1 to about 10 cm. Applicants further submit that Smith teaches the formation of a shaped article and is silent regarding a winding process. DE '159 and Saint Gobain offer no teachings that can be added with Smith to arrive at the

claimed method. It is therefore respectfully submitted that one of skill in the art simply would not arrive at the claimed method based on the teachings of DE '159, Saint Gobain, and Smith. Without some teaching or suggestion there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness.

In addition, because DE '159, Saint Gobain, and Smith do not teach or suggest a composite strip formed of a second material reinforced with a first composite strip having a width of about 1 to about 10 cm, Applicants respectfully submit that DE '159, Saint Gobain, and Smith, alone or in any combination, fail to teach all of the claim limitations set forth in claim 16. Therefore, it is submitted that a *prima facie* case of obviousness has not been established for this additional reason.

Turning to claim 38, Applicants respectfully submit that DE '159, Saint Gobain, and Smith, alone or in any combination, fail to teach the claimed method. In particular, Applicants respectfully submit that DE '159, Saint Gobain, and Smith do not teach or suggest varying the molten material provided to the die in-line to vary the wt% of reinforcing material contained in the second composite strip. Indeed, DE '159, Saint Gobain, and Smith are silent with respect to any teaching or suggestion of varying the amount molten material provided to the die is in-line to vary the wt % amount of reinforcing material contained in the second composite strip. Accordingly, it is submitted that the combination of DE '159, Saint Gobain, and Smith would not result in the method recited in claim 38. As such, it is submitted that claim 38 is non-obvious and patentable.

Also, Applicants respectfully submit that the features of claim 39, which was not included in this rejection, have been included into claim 38. It is respectfully submitted that claim 38 is patentable for this additional reason.

In view of the above, it is respectfully submitted that independent claims 16 and 38 are not taught or suggested by DE '159, Saint Gobain, and Smith, either alone or in any combination, and that claims 16 and 38 are therefore non-obvious and patentable. With respect to dependent claims 18-22, 31, 32, and 40-42, Applicants submit that because independent claims 16 and 38 are not taught or suggested by DE '159, Saint Gobain, and Smith and claims 18-22, 31, 32, and 40-42 are dependent upon one of claims 16 or 38, dependent claims 18-22, 31, 32, and 40-42 are also not taught or suggested by DE '159, Saint Gobain, and/or Smith.

Accordingly, Applicants respectfully submit that claims 16, 18-22, 31, 32, and 40-42 are not obvious over DE '159 in view of Saint Gobain and Smith and respectfully request reconsideration and withdrawal of this rejection.

**Rejection under 35 U.S.C. §103(a)**

Claims 33-37 and 39 have been rejected under 35 U.S.C. §103(a) as being obvious over German Patent No. 119852159 to Formann, *et al.* ("DE '159") in view of in view the internet publication dated July 30, 2001, from the website <http://www.twintex.com/fabrication-processes/tw-process.html> ("Saint Gobain") and further in view of WO 00/47397 to Ian Gray ("Gray"). The Examiner asserts that Gray teaches that it was desirable to vary the strength of the pultruded component along its length. The Examiner asserts that to do the same, one skilled in the art would have varied the cross sectional shape of the product by varying the cross sectional shape of the die as is assertedly envisioned by Gray. Additionally, the Examiner states that "in order to avoid resin rich or resin starved areas while changing the cross sectional shape at the exit of the die, one must increase the amount of resin fed to the die during pultrusion". The Examiner notes that "varying [the] resin percentage content in the cross section along the length while maintaining the amount of reinforcement constant would have resulted in varied product strength along the length of the material exiting the die". The Examiner also asserts that DE '159 suggest that after exiting the die, the material is wound on a die and that such processing with a variable cross section die would have resulted in variable weight percent of resin along the length of the wound product. The Examiner concludes that it would have been obvious to one of skill in the art to employ the techniques of Gray in the process of DE '159 with Saint Gobain to vary the amount of reinforcement and the final strength in the finished composite assembly.

**Applicants' Response**

Initially, Applicants submit that claim 39 has been canceled without prejudice, thereby rendering the rejection of claim 39 moot.

In response to the rejection of the remaining claims, Applicants respectfully direct the Examiner's attention to independent claim 33 and submit that claim 33 defines a method for manufacturing a body of revolution that is not taught within DE '159, Saint Gobain, and Gray. In addition, Applicants submit that DE '159, Saint Gobain, and Gray fail to teach the combination of features recited in claim 33.



Gray teaches a method of producing a fiber reinforced composite that includes incorporating additional reinforcing fibers to the fibers pulled through the pultrusion die. (*See, e.g.*, page 1, lines 19-25). These additional fibers may have a characteristic different from the reinforcing fibers, and may vary the strength characteristics of the final product without altering the cross sectional area of the pultruded part. (*See, e.g.*, page 1, line 24 to page 2, line 2). In particular, the additional fibers are added to provide an area having characteristics such as tenacity or modulus that is different from that of the reinforcing fibers. (*See, e.g.*, page 3, lines 6-9).

These teachings of Gray may be contrasted to the method claimed in claim 33 where the molten material is varied in-line to vary the wt% of reinforcing material contained in the second composite strip and where the wt% amount of reinforcing material is varied along the length of the rotating support. Gray specifically teaches the inclusion of additional fibers, not molten material. Nowhere in Gray is there any teaching or suggestion of varying an amount of molten material. Indeed, Gray is silent with respect to any teaching or suggestion of varying the amount of molten material in-line as required by claim 33. Applicants respectfully submit that the addition of fibers to the reinforcing fibers to “provide an area 18 having a characteristic such as tenacity or modulus different from that of the fibers 14” as taught by Gray is vastly different from varying the amount of molten material provided to the die to vary the wt% amount of reinforcing material as presently claimed. DE ‘159 and Saint Gobain do not teach or even suggest varying the amount of molten material contained in the second composite strip or of varying the percent amount of reinforcing material along the length of the rotating support by varying the amount of molten material. Accordingly, it is respectfully submitted that the combination of DE ‘159, Saint Gobain, and Gray would not result in the claimed invention.

In addition, Applicants respectfully submit that there is no motivation for one of skill in the art to arrive at a method for manufacturing a body of revolution as claimed in claim 33 based on the disclosures of DE ‘159, Saint Gobain, and Gray. In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. (*See, e.g.*, *Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August

2008, §2143 citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007)).

Applicants respectfully submit that one of ordinary skill in the art would have no motivation to arrive at the method of claim 33 based on the teachings of DE '159, Saint Gobain, and Gray at least because none of DE '159, Saint Gobain, or Gray teaches or suggests varying the amount of molten material in-line to vary the wt% amount of reinforcing material in the second composite strip. Indeed, it is respectfully submitted that DE '159, Saint Gobain, and Gray are silent with respect to any teaching or suggestion of varying the amount of molten material in-line. Without some teaching or suggestion, there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness.

In addition, because DE '159, Saint Gobain, and Gray do not teach or suggest varying the amount of molten material in-line to vary the wt% of reinforcing material contained in the second composite strip, Applicants respectfully submit that DE '159, Saint Gobain, and Gray, alone or in any combination, fail to teach all of the claim limitations set forth in claim 33. Therefore, it is submitted that a *prima facie* case of obviousness has not been established for this additional reason.

In the outstanding Office Action, the Examiner asserts that in order to avoid resin rich or resin starved areas while changing the cross sectional shape at the exit of the die, "one must increase the amount of resin fed to the die during pultrusion". (*See, e.g.*, page 7, lines 1-3 of the Office Action dated May 13, 2009). Additionally, the Examiner asserts that varying the resin percentage content in the cross section along the length while maintaining the amount of reinforcement constant would have resulted in varied product strength along the length of the material exiting the die. (*See* page 7, lines 3-5 of the Office Action dated May 13, 2009). Applicants respectfully submit that the Examiner is relying on knowledge without providing proper evidentiary support in the record. (*See, e.g., Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August 2008, §2144.03). Applicants further submit that the Examiner's assertions are not well-known and accordingly, Applicants respectfully request that the Examiner provide proper documentary support.

Further, in the outstanding Office Action, the Examiner asserts that Applicants have admitted that Gray teaches that the cross sectional shape may be changed by varying the amount of thermoplastic introduced into the die, but that the reference taught away from doing this because it was complicated and complex. (*See* the paragraph bridging pages 7 and 8 of the Office Action dated May 15, 2009). Applicants strongly disagree.

It is respectfully submitted that Applicants argued that variable shape dies may not be reliable and/or accurate and, as a consequence thereof, Gray teaches away from the use of variable cross-sectional dies. In a separate and additional argument, Applicants argued that there is no teaching or suggestion within Gray of varying the amount of molten material provided to the die in-line to vary the second wt % amount of reinforcing material contained in the second composite strip as required in claim 33. Thus, what Applicants argued was that (1) variable shape dies are not reliable or accurate and (2) Gray does not teach or suggest varying the amount of molten material provided to the die in-line as claimed. In no way did Applicants even imply that Gray teaches that the cross sectional shape may be changed by varying the amount of thermoplastic entering into the die. Indeed, Applicants specifically stated that Gray teaches varying the strength characteristics of the final product along its length by “drawing through a pultrusion die a series of reinforcing fibres to form a pultruded fibre composite product characterized by incorporating in the reinforcing fibers prior to the pultrusion step *additional fibres*” (emphasis added). (See the paragraph bridging pages 12 and 13 of the Amendment filed on April 3, 2009). Nowhere is there any statement or suggestion by Applicants that an amount of thermoplastic material was varied in Gray.

In view of the above, it is respectfully submitted that independent claim 33 is not taught or suggested by DE ‘159, Saint Gobain, and Gray, either alone or in any combination, and that claim 33 is therefore non-obvious and patentable. With respect to dependent claims 34-37, Applicants submit that because independent claim 33 is not taught or suggested by DE ‘159, Saint Gobain, and Gray and claims 34-37 are dependent upon claim 33 and contain the same elements as claim 33, dependent claims 34-37 are also not taught or suggested by DE ‘159, Saint Gobain, and/or Gray.

Accordingly, Applicants respectfully submit that claims 33-37 are not obvious over DE ‘159 in view of Saint Gobain and Gray and respectfully request that the Examiner reconsider and withdraw this rejection.

### **Conclusion**

In light of the above, Applicants believe that this application is now in condition for allowance and therefore request favorable consideration.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

If necessary, the Commissioner is hereby authorized to charge payment or credit any overpayment to Deposit Account No. 50-0568 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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